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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/754,930	01/08/2004	Christophe Maleville	4717-8400	9223
28765	7590	12/14/2004	EXAMINER LEE, CALVIN	
WINSTON & STRAWN PATENT DEPARTMENT 1400 L STREET, N.W. WASHINGTON, DC 20005-3502			ART UNIT 2825	PAPER NUMBER

DATE MAILED: 12/14/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/754,930

Applicant(s)

MALEVILLE et al.

Examiner

Lee, Calvin

Art Unit

2825

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 9/20/04 (Amendment A).
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-19 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. The amendment of claim 1 dated September 20, 2004 is acknowledged.

Claim Rejections - 35 U.S.C. § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office Action:

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

Note: This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a)

3. Claims 1, 3-13, 15-16 and 18-19 are rejected under 35 U.S.C. 102(e) as being anticipated by *Aga et al* '609.

Aga et al disclose a process of treating a superficial zone of a transferred SOI layer (col. 5, lns.45-67 and col. 6, lns.1-20) before conducting RTA to prevent pitting during the RTA. The process comprises conducting a temperature annealing in a neutral atmosphere at a temperature of 1000 to 1300 °C (col. 6, lns.20-35). The process also comprises removing a disturbed portion of the superficial zone by a chemical attack that includes wet etching. (col. 6, lns.20-67). The chemical attack includes a sacrificial oxidation that comprises an oxidation, anneal and deoxidation step (col. 6, lns.20-67). The oxidation and anneal are carried out at less than 1000 °C (col. 7, lns.52-58) and at a constant temperature. The deoxidation step comprises the use of a solution that removes a few thousand angstroms of material wherein the solution comprises a 10% HF solution (col. 10, lns.35-50).

The examiner points out that even though applicant points out on page 4 and 5 of the specification that *Aga et al* discloses that COPS may extent down to the embedded oxide, this language "may" does not exclude the "pitting" that is addressed in the pending application, thus the process disclosed in *Aga et al* still anticipates the claimed subject matter of the present application

Claim Rejections - 35 U.S.C. § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Aga et al*, as applied to claim 1, in view of *Applicant's Prior Art* (p. 1 of specification).

As stated in paragraph 2, all the limitations of this claim have been met except for teaching that the RTA is performed in a non-reducing atmosphere.

Applicants' Prior Art admittedly suggests that it is well known in the prior art to conduct an RTA either in a reducing or in a non-reducing atmosphere.

It would have been obvious to one with ordinary skill in the specific art to combine the teachings admitted to be well known in the prior art to the invention of *Aga et al*, since according to applicant's admission one with ordinary skill in the art would be aware of RTA with or without a reducing atmosphere and thus know that these processes may be successfully interchanged.

6. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Aga et al*, as applied to claim 1, in view of *Nakashima et al* '981.

As stated in paragraph 2, all the limitations of this claim have been met except for specifying that the anneal step overextends the oxidation process and that the anneal process comprises a ramping up period. *Nakashima et al* teaches that the oxidation step may be shorter than the anneal step that is performed concurrently during the oxidation of a surface of a transferred SOI to reduce the surface roughness (col. 9, ln.60 thru col. 10, ln.5).

It would have been obvious to one with ordinary skill in the specific art to combine the teachings of *Nakashima et al*. to those of *Aga et al*, since *Nakashima et al* teach that this oxidation process is interchangeable with other well known processes in the art (col. 9) and thus one with ordinary skill in the art being aware of the interchangeability would have an expectation of success.

7. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over *Aga et al*, as applied to claim 1, in view of *Park et al* '198.

As stated in paragraph 2, all the limitations of this claim have been met except for specifying that after the RTA process another sacrificial oxide is formed.

Park et al teaches the formation of CMOS over SOI and teaches that a sacrificial oxide may be formed after the SOI is ready for manufacturing of the CMOS (col. 3, lns.20-30).

It would have been obvious to one with ordinary skill in the specific art to combine the teachings of *Park et al* to those of *Aga et al* and form a sacrificial oxide, since in the formation of CMOS *Park et al* teaches the desire of forming bird beaks and this involves the formation of a sacrificial oxide (see *Park et al* , col. 3, lns.20-30).

Response to Arguments

8. Applicants argued that “*Aga et al* does not suggest or teach to treat a superficial zone before conducting rapid thermal annealing to prevent pitting in the superficial zone during the rapid thermal annealing.” First of all, *Aga et al* inherently teaches or suggests a superficial zone because *Aga et al* discloses a wafer having a surface and being subjected to a RTA annealing step. Last but not least, Examiner takes the position that Applicants disclose the heat treatment not only “to prevent small holes or voids in the wafer surface in the superficial zone” [in claim 1] but also “to reconstruct the superficial zone” [¶ 0029]; “to remove a disturbed portion of the superficial zone” [¶ 0030]; “to prevent the onset of any pitting” [¶ 0032]; “to reconstruct the disturbed zone of the wafer surface and to remove defects which would lead to pitting during RTA annealing” [¶ 0034]; “to remove the superficial zone ... by wet or dry etching” [¶ 0035]; “to reduce or remove not only the cavities (which cause the pitting phenomenon), but to reduce or remove the disturbed superficial zone itself ... by sacrificial oxidation” [¶ 0037]; “to improve the qualities of the material that form the superficial zone” [¶ 0039]; and “to cure the defects that are generated during the preceding fabrication process” [¶ 0041].

Those recognized functions are therefore interchangeable with the claimed function. In *Aga et al*, a combination of sacrificial oxidation and heat treatment to remove a damage layer and surface roughness of the SOI layer is considered as a pre-treat of the wafer before a subsequent RTA step. In column 2, lines 37-49, pitting in the surface area is instead to be eliminated by *Aga et al*. Therefore, the Examiner does not find Applicants' arguments persuasive.

9. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire three months from the mailing date of this action. In the event a first reply is filed within two months of the mailing date of this final action and the advisory action is not mailed until after the end of the three-month shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than six months from the date of this final action.

Contact Information

10. Any inquiry concerning this communication from the Examiner should be directed to *Calvin Lee* at (571) 272-1896, Monday to Thursday, from 7 to 5 (ET). If attempts to reach the examiner by telephone are unsuccessful, Art Unit 2825's Supervisory Patent Examiner *Matthew Smith* whose telephone number is (571) 272-1907.

Any inquiry relating to the status of this application should be directed to the Group receptionist whose telephone number is (703) 308-0596. The central fax number is (703) 872-9306 for all communications to be entered (e.g., amendments, remarks, IDS, etc.)



December 8, 2004



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